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(Reaffirmed 2012)
(Reaffirmed 2017)
(Reaffirmed 2022)

भारतीय मानक

वाल्व, फिटिंग और अन्य पाइप-घटकों के लिए इस्पात ढलाइयों की सतह गुणता के निरीक्षण के लिए संहिता
(दृश्य पद्धति)
(पहला पुनरीक्षण)

Indian Standard

CODE FOR INSPECTION OF SURFACE QUALITY OF STEEL CASTINGS FOR VALVES, FITTINGS AND OTHER PIPING COMPONENTS (VISUAL METHOD)

(First Revision)

UDC 669·14-14 : 620·191 : 621·643·4

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NEW DELHI 110002

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Price Group 10

Steel Castings Sectional Committee, MTD 17

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards after the draft finalized by the Steel Castings Sectional Committee had been approved by the Metallurgical Engineering Division Council.

This standard was first published in 1976. In this revision, the scope has been extended for the surface quality of steel castings conforming to IS 4899 : 1991 'Specification for ferritic martensitic steel castings for use at low temperatures', IS 7806 : 1985 'Specification for martensitic and austenitic steel castings for high temperature service' and IS 7899 : 1984 'Specification for alloy steel castings, suitable for pressure service steel castings of piping components' have also been included.

This standard is intended to supplement the requirements of steel castings for valves and fittings conforming to IS 2856 : 1987 'Specification for carbon steel castings for high temperature service (fusion welding quality) (*second revision*)', IS 3038 : 1983 'Specification for alloy steel castings for pressure containing parts for high temperature service (*first revision*)', IS 4899 : 1991, IS 7806 : 1985 and IS 7899 : 1984.

Indian Standard

CODE FOR INSPECTION OF SURFACE QUALITY OF STEEL CASTINGS FOR VALVES, FITTINGS AND OTHER PIPING COMPONENTS (VISUAL METHOD)

(*First Revision*)

1 SCOPE

1.1 This standard covers twelve general types of surface irregularities and five examples of each type of irregularity have been included in this standard.

1.2 The two examples in each case shown to the left illustrate acceptable degrees of particular type of irregularity. The three examples to the right are characterized as containing unacceptable defects (*see* Fig. 1 to 12).

1.3 It is recognized that problems may be encountered in evaluating surface of casting over a wide range of size and section thickness using the same set of standards. This standard attempts to minimize the size effect and is intended for general use for any 100 mm × 125 mm area.

2 REFERENCE PHOTOGRAPHS

2.1 A set of 60 reference photographs illustrating various casting surface irregularities which can be observed by visual inspection are included in this standard (*see* Fig. 1 to 12).

2.2 These photographs are actual size examples of gradations in acceptable and non-acceptable irregularities. It is intended that irregularities less pronounced than those shown as non-acceptable shall be accepted under this standard.

2.3 Photographs included are of actual castings and may exhibit surface irregularities other than the type characterized in the heading. Each type of surface irregularity shall be judged only against the series of photographs identified with the type.

3 DESCRIPTION

3.0 The types of surface irregularities illustrated in the reference photographs are as described below. It should be noted that these descriptions apply only to surface irregularities and not to internal defects.

3.1 Type I — Hot Tears and Cracks (Fig. 1)

Linear surface discontinuities or fractures caused by either internal or external stresses or a combination of both acting on the casting. They may occur during or subsequent to solidification. In general, visible surface cracks and/or hot tears are not acceptable.

3.2 Type II — Shrinkage (Fig. 2)

A void left in cast metals as a result of solidification shrinkage and the progressive freezing of metal, which is exposed upon cutting off risers and gates.

3.3 Type III — Sand Inclusions (Fig. 3)

Sand which becomes entrapped in the molten metal and shows on casting surfaces.

3.4 Type IV — Gas Porosity (Fig. 4)

Voids in cast metal caused by entrapment of gas during solidification.

3.5 Type V — Veining (Fig. 5)

Features on the surface of castings appearing as a ridge and associated with movement or cracking of sand.

3.6 Type VI — Rat Tails (Fig. 6)

Features on the surface of castings appearing as a depression resulting from faulting or buckling of the mould surfaces.

3.7 Type VII — Wrinkles, Laps, Wares, Folds and Coldshuts (Fig. 7)

Surface irregularities caused by incomplete fusing or by folding of molten metal surfaces.

3.8 Type VIII — Cutting Marks (Fig. 8)

Irregularities in casting surfaces resulting from burning or mechanical means used in the cleaning of castings.

3.9 Type IX — Scabs (Fig. 9)

Slightly raised surface blemishes which are usually sand crusted over by a thin porous layer of metal.

3.10 Type X — Chaplets (Fig. 10)

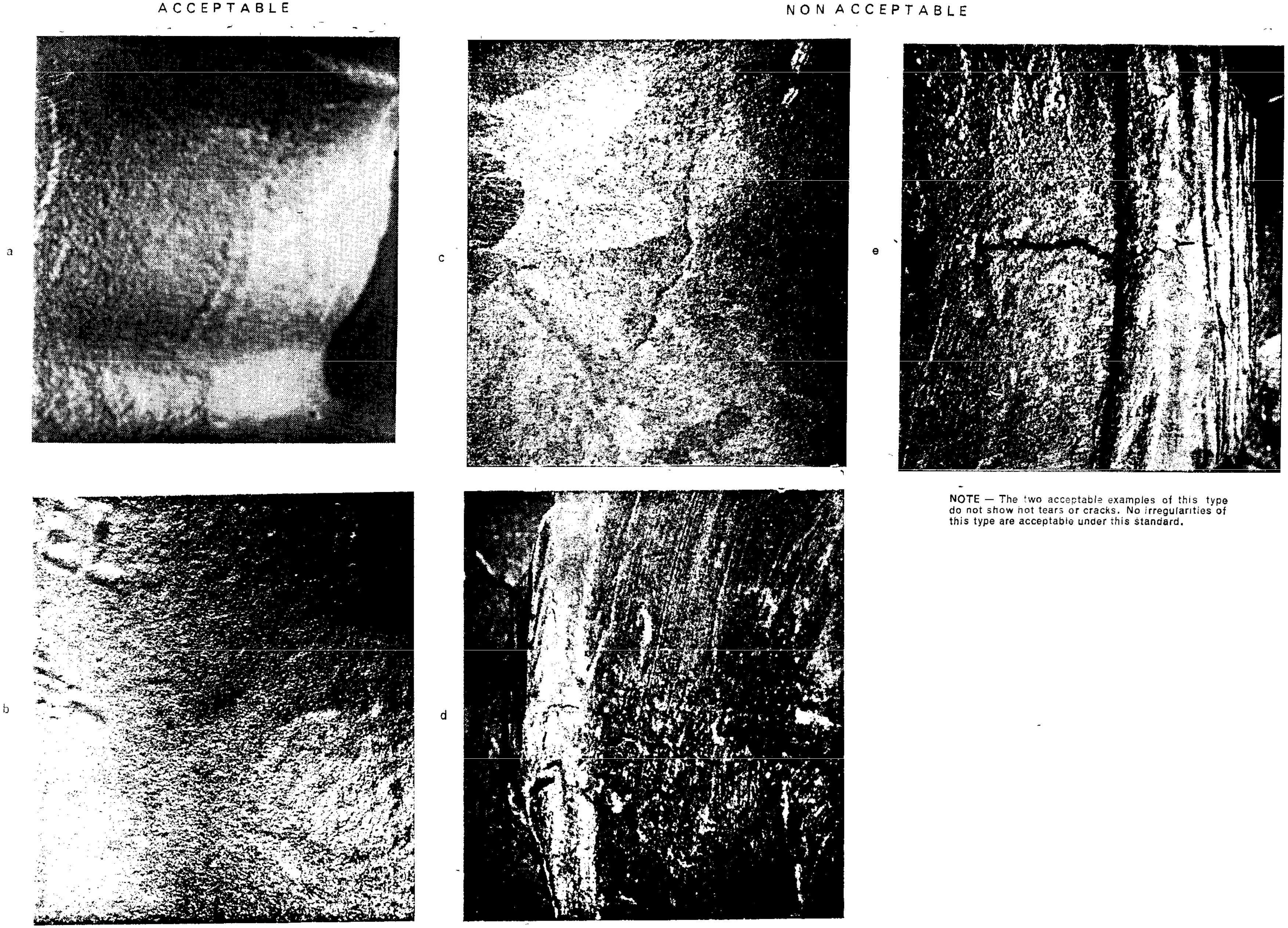
Evidence of chaplets on surface of casting disclosing incomplete fusion, which likewise can apply to internal chills.

3.11 Type XI — Weld Repair Areas (Fig. 11)

Evidence of improper surface preparation after welding.

3.12 Type XII — Surface Roughness (Fig. 12)

Surface texture due to design, pattern, gatting and sand conditions.



NOTE — The two acceptable examples of this type do not show hot tears or cracks. No irregularities of this type are acceptable under this standard.

FIG. 1 TYPE I — HOT TEARS AND CRACKS

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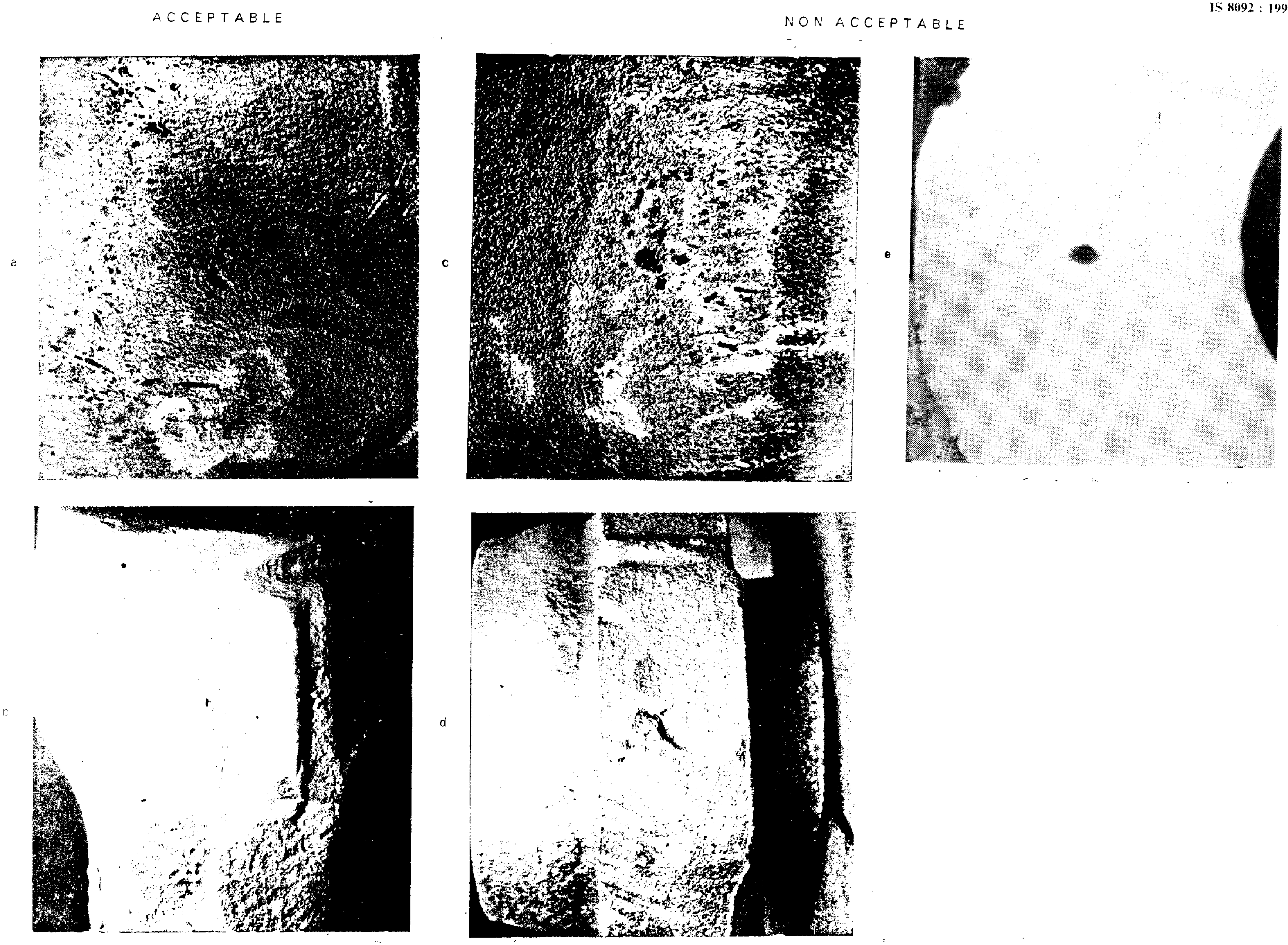

FIG. 2 TYPE II — SHRINKAGE

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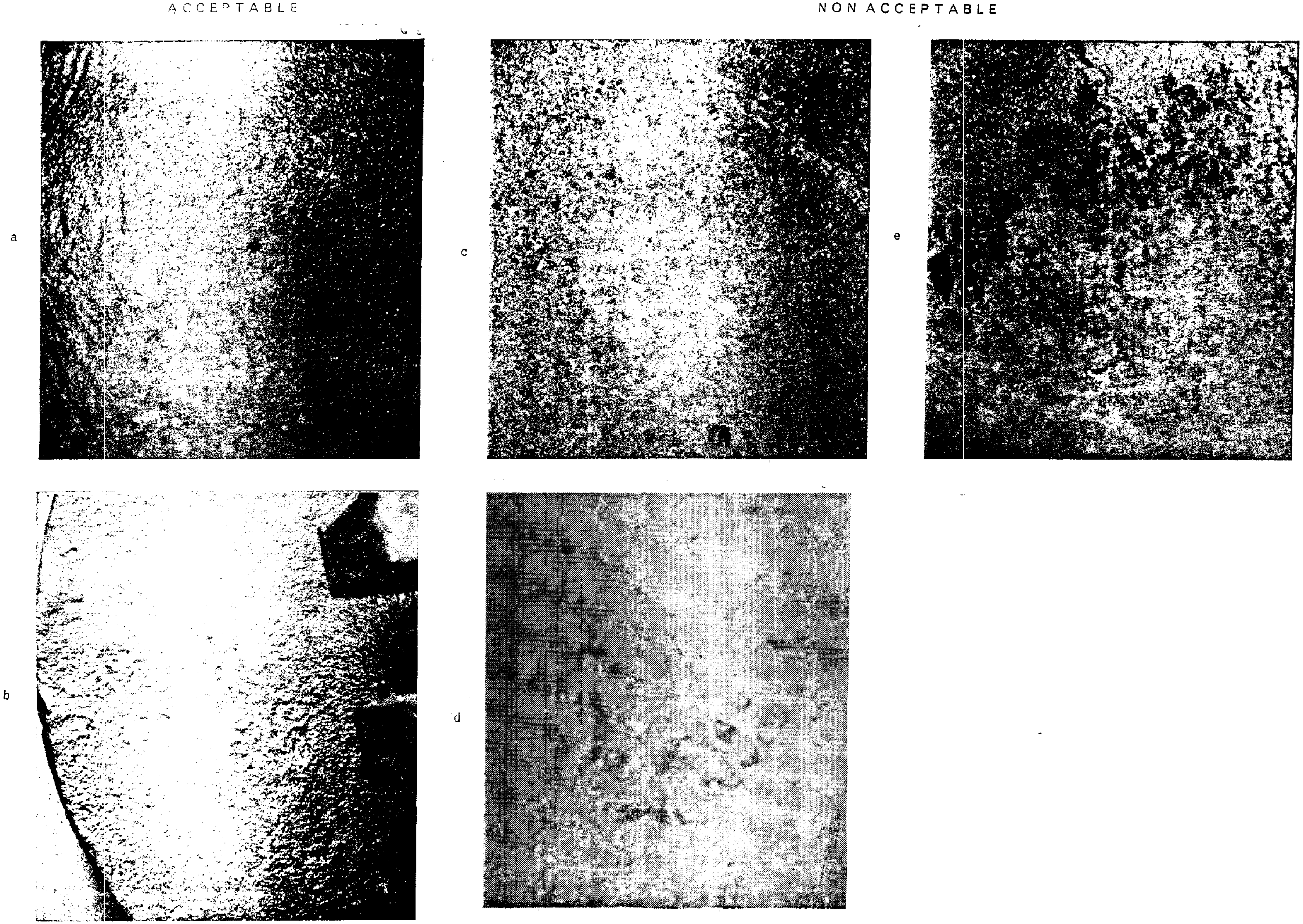

FIG. 3 TYPE III — SAND INCLUSIONS

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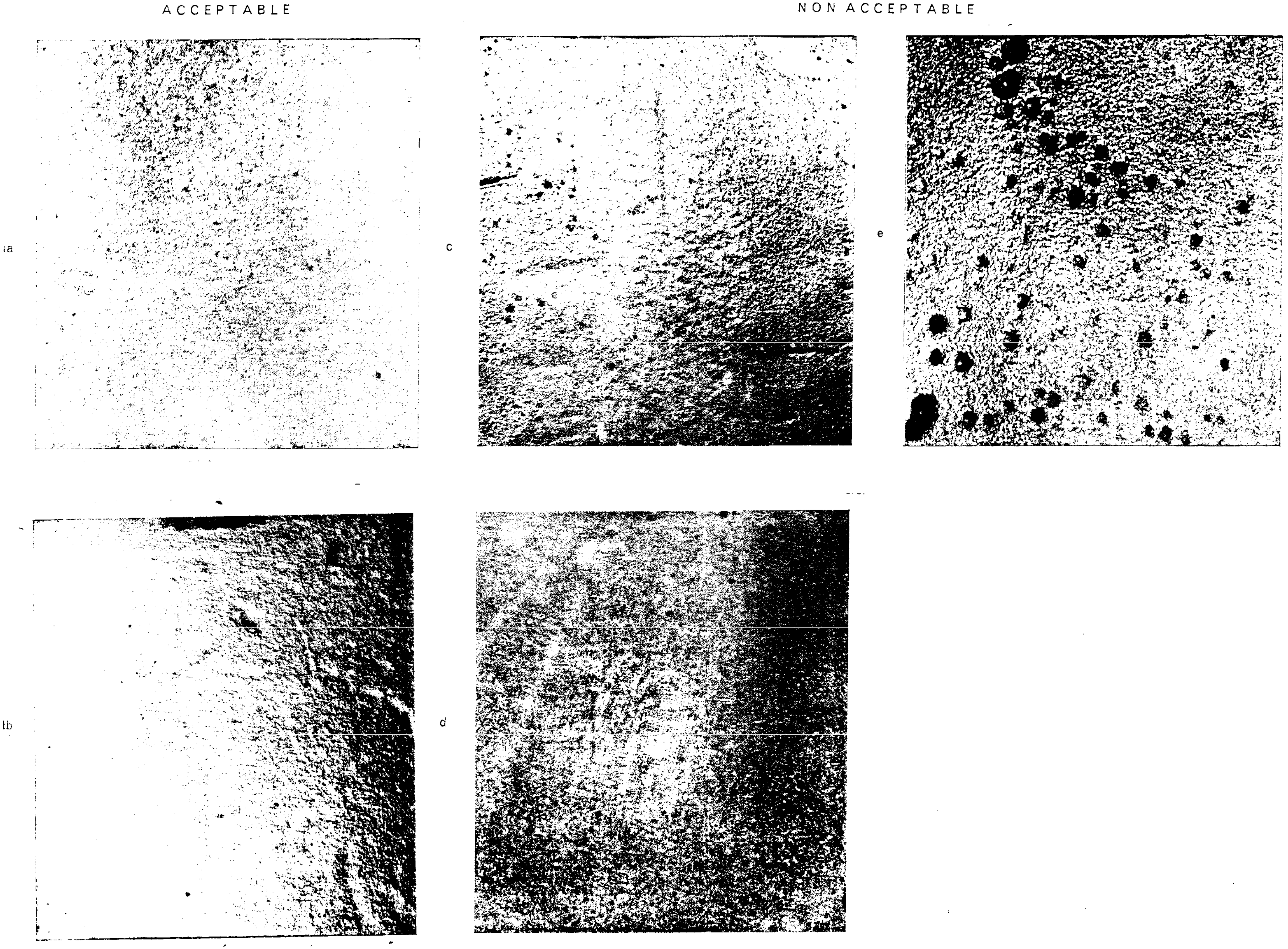

Fig. 4 Type IV — Gas Porosity

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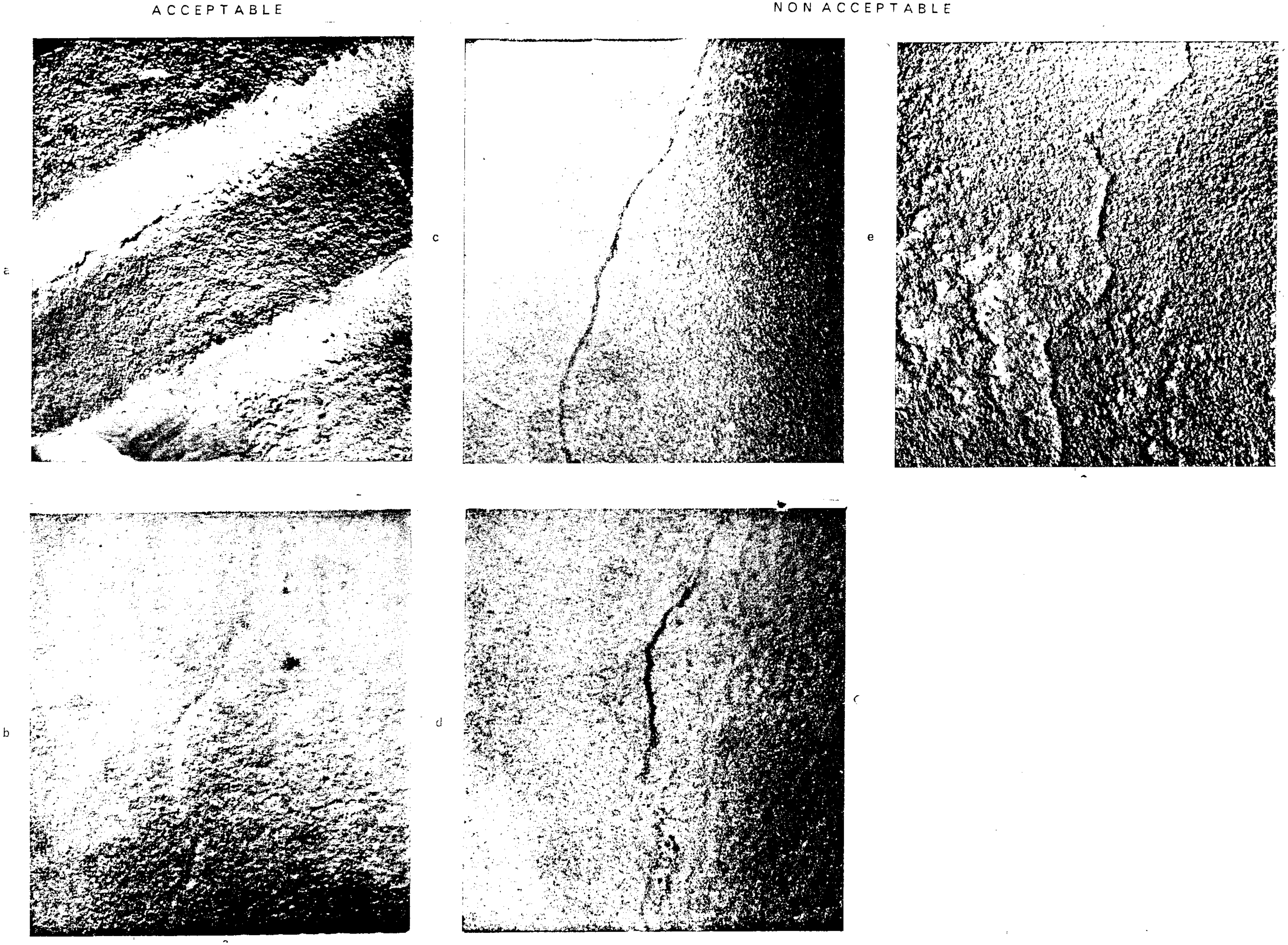

FIG. 5 TYPE V — VEINING

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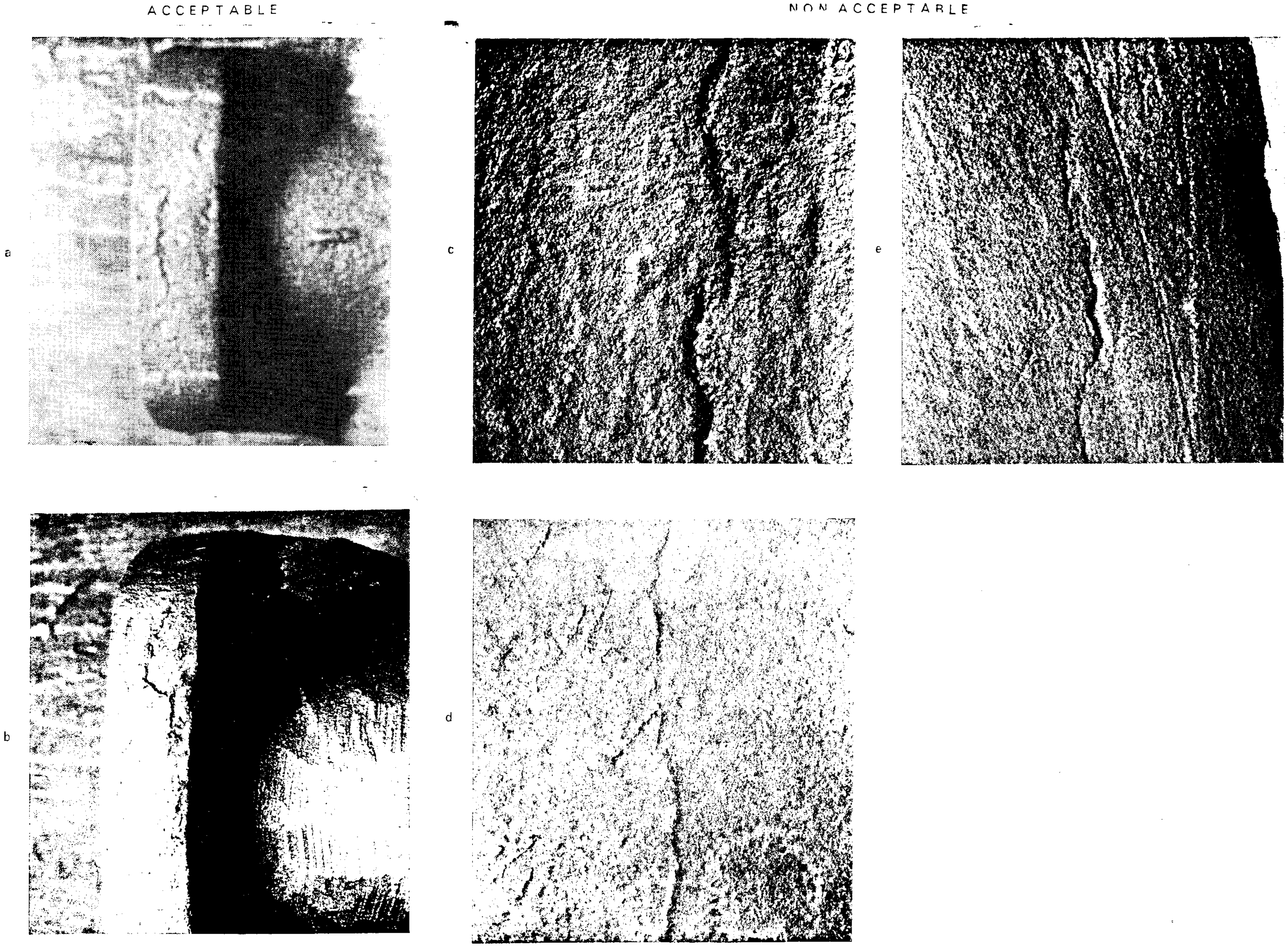

FIG. 6 TYPE VI — RAT TAILS

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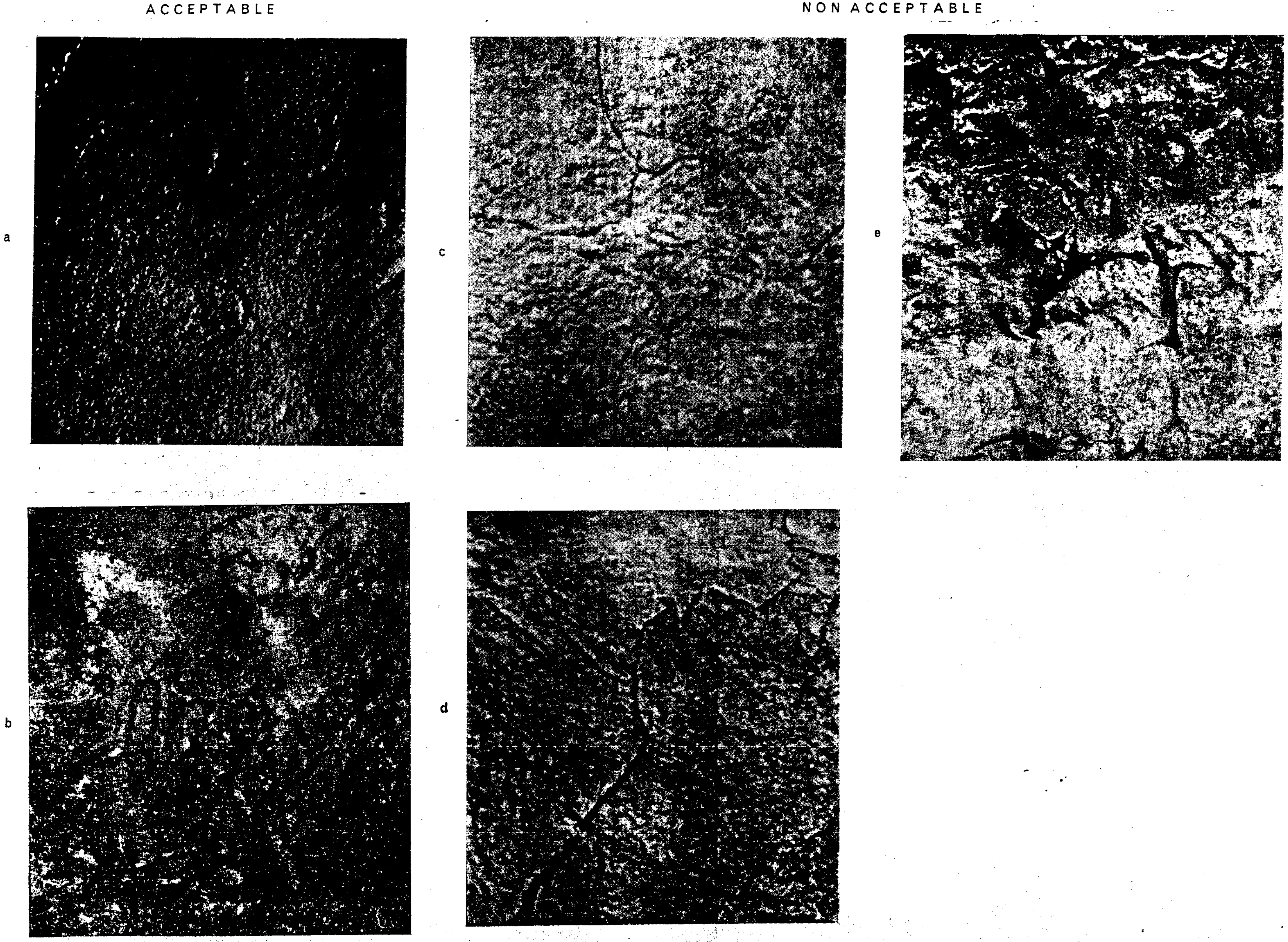

Fig. 7 Type VII — Wrinkles, Laps, Wares, Folds and Coldshuts

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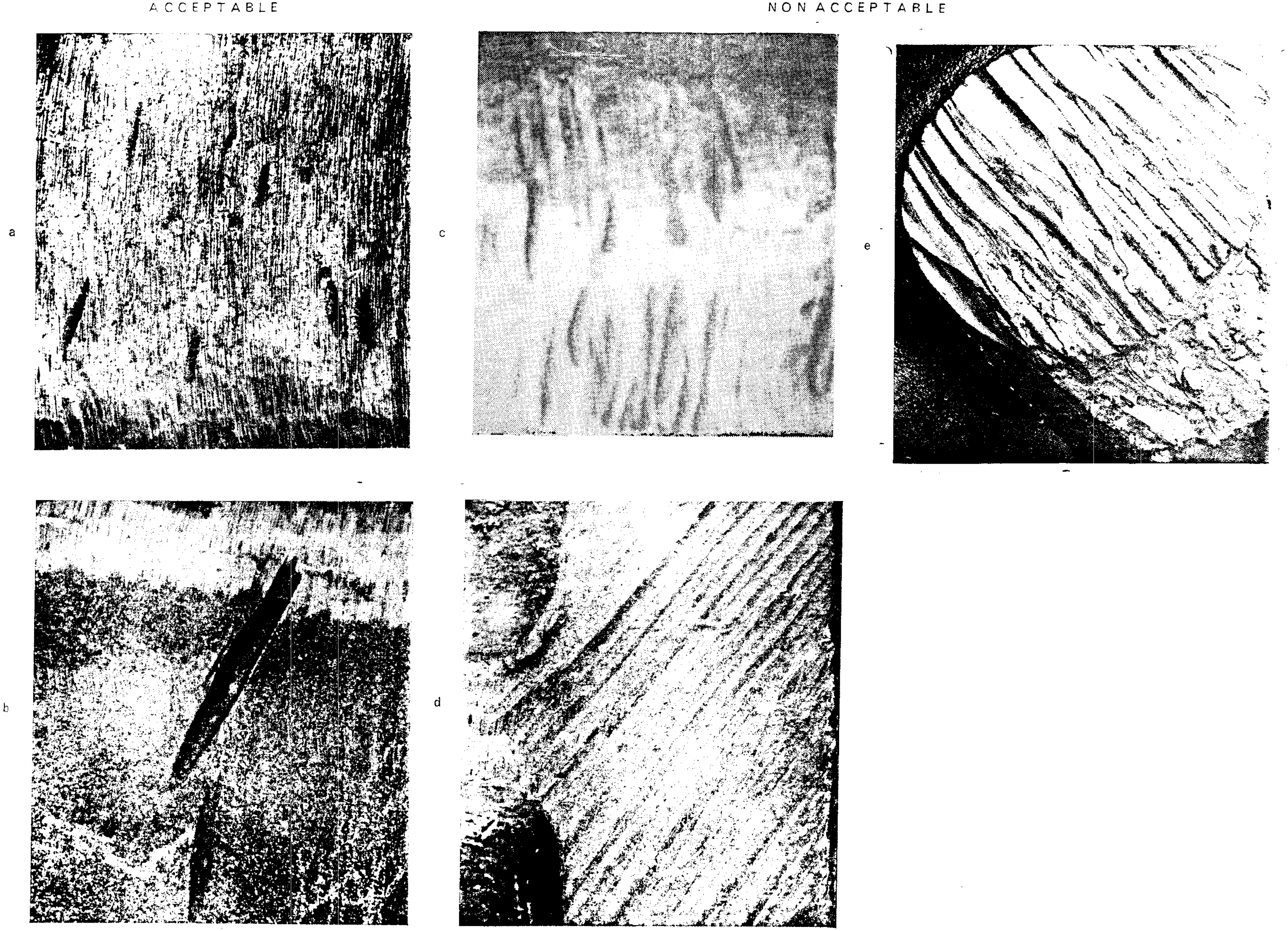

FIG. 8 TYPE VIII — CUTTING MARKS

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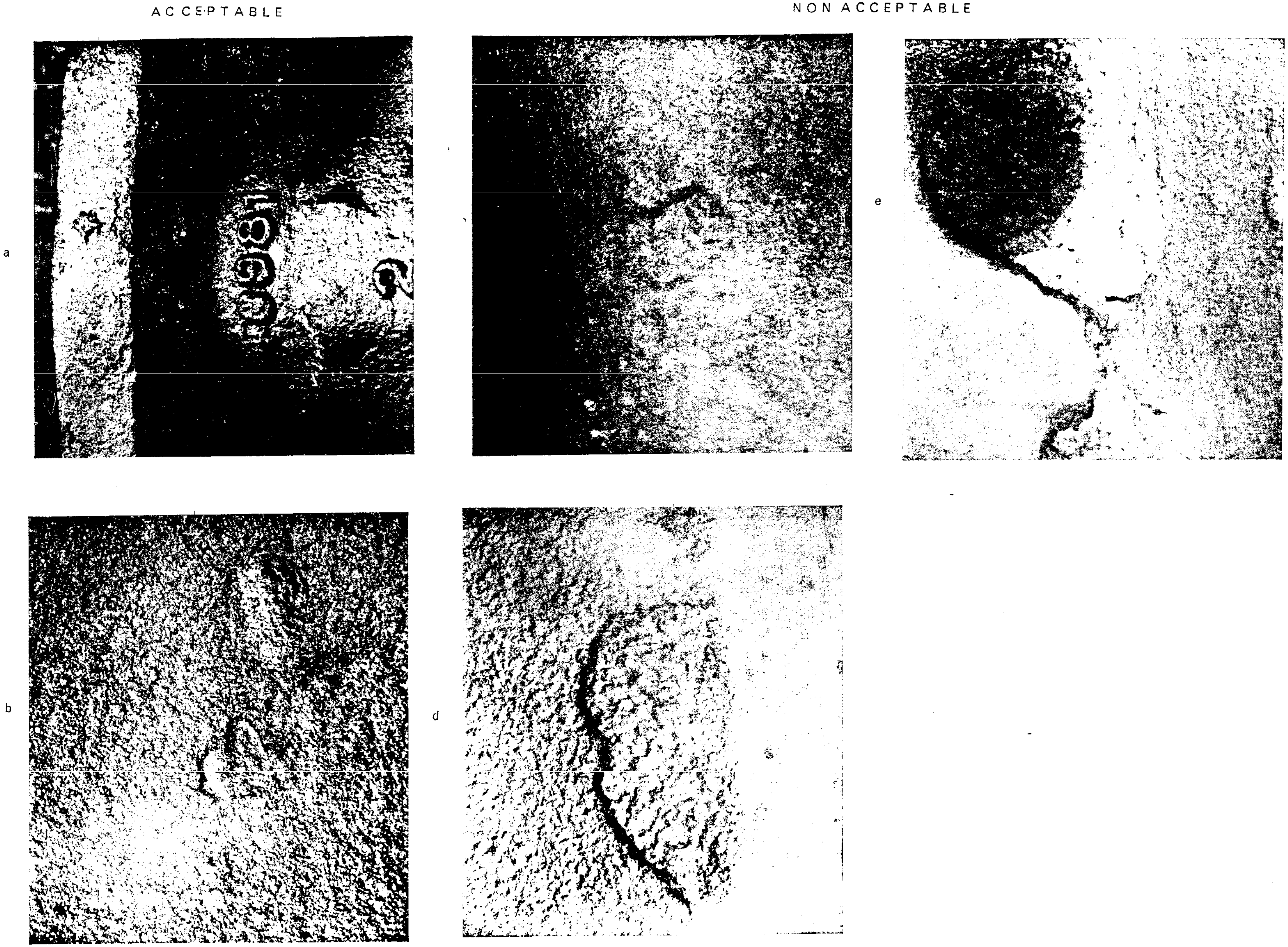

FIG. 9 TYPE IX — SCABS

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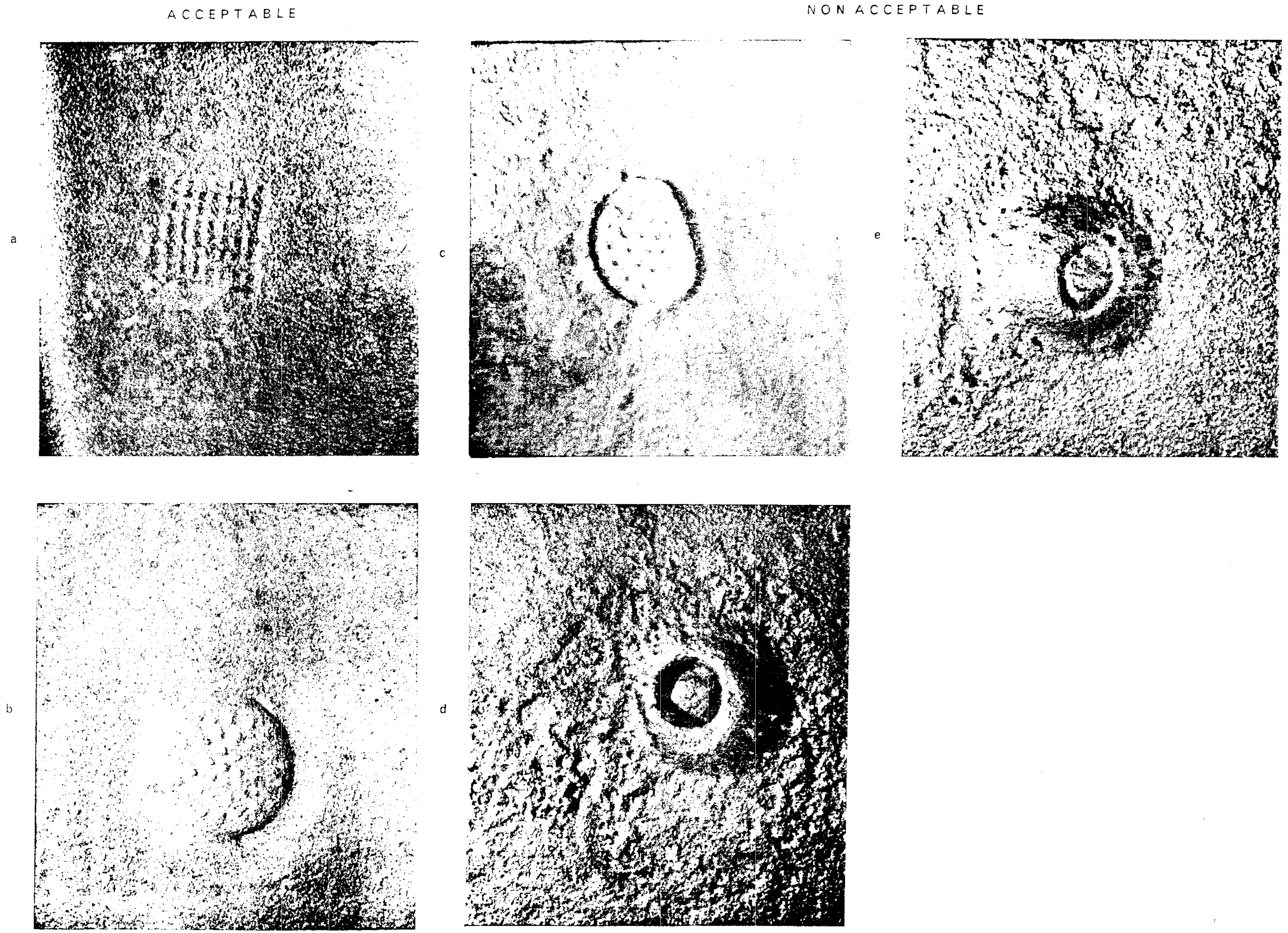

FIG. 10 TYPE X — CHAPLETS

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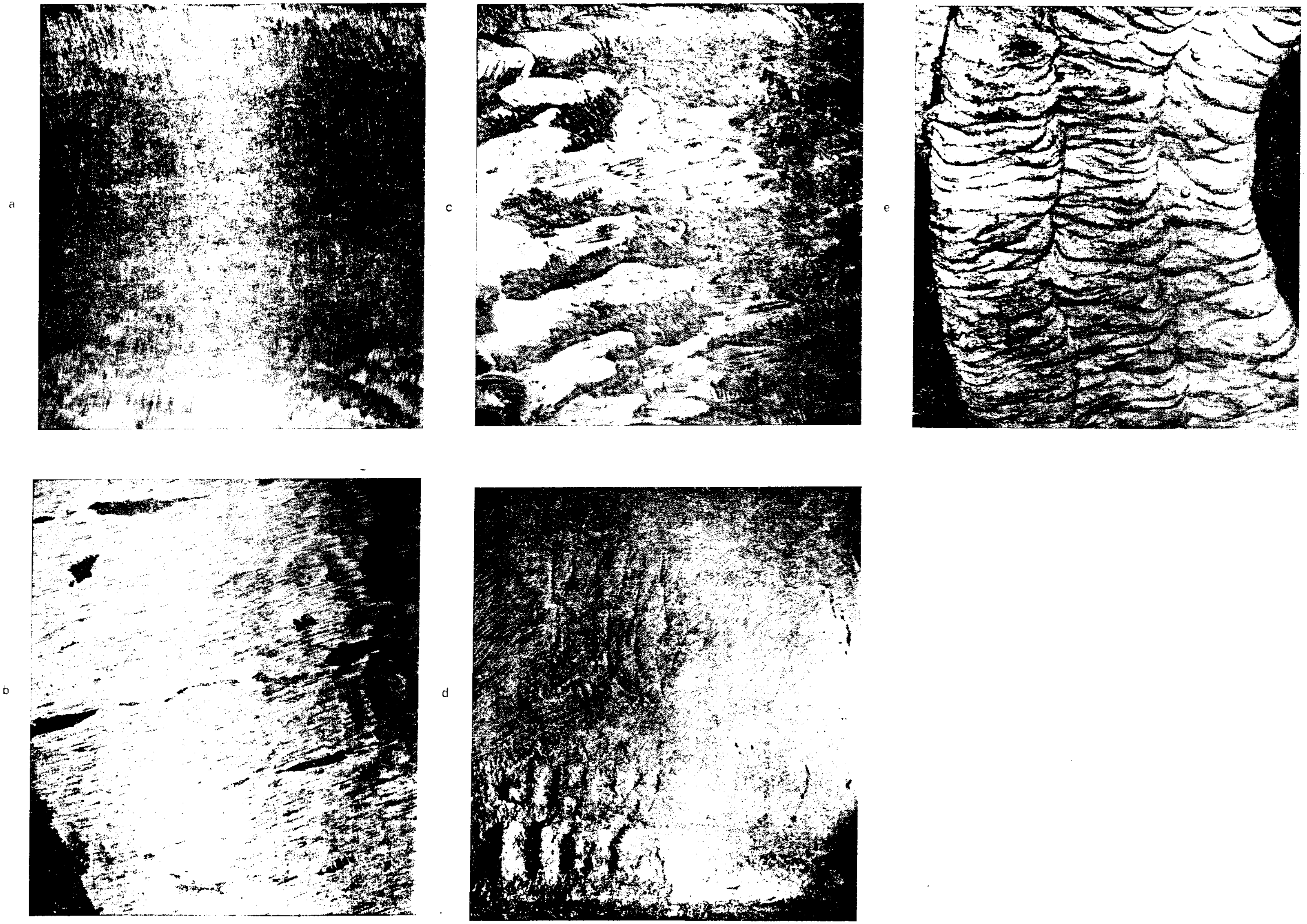

FIG. 11 TYPE XI WELD REPAIR AREAS

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ACCEPTABLE

NON ACCEPTABLE

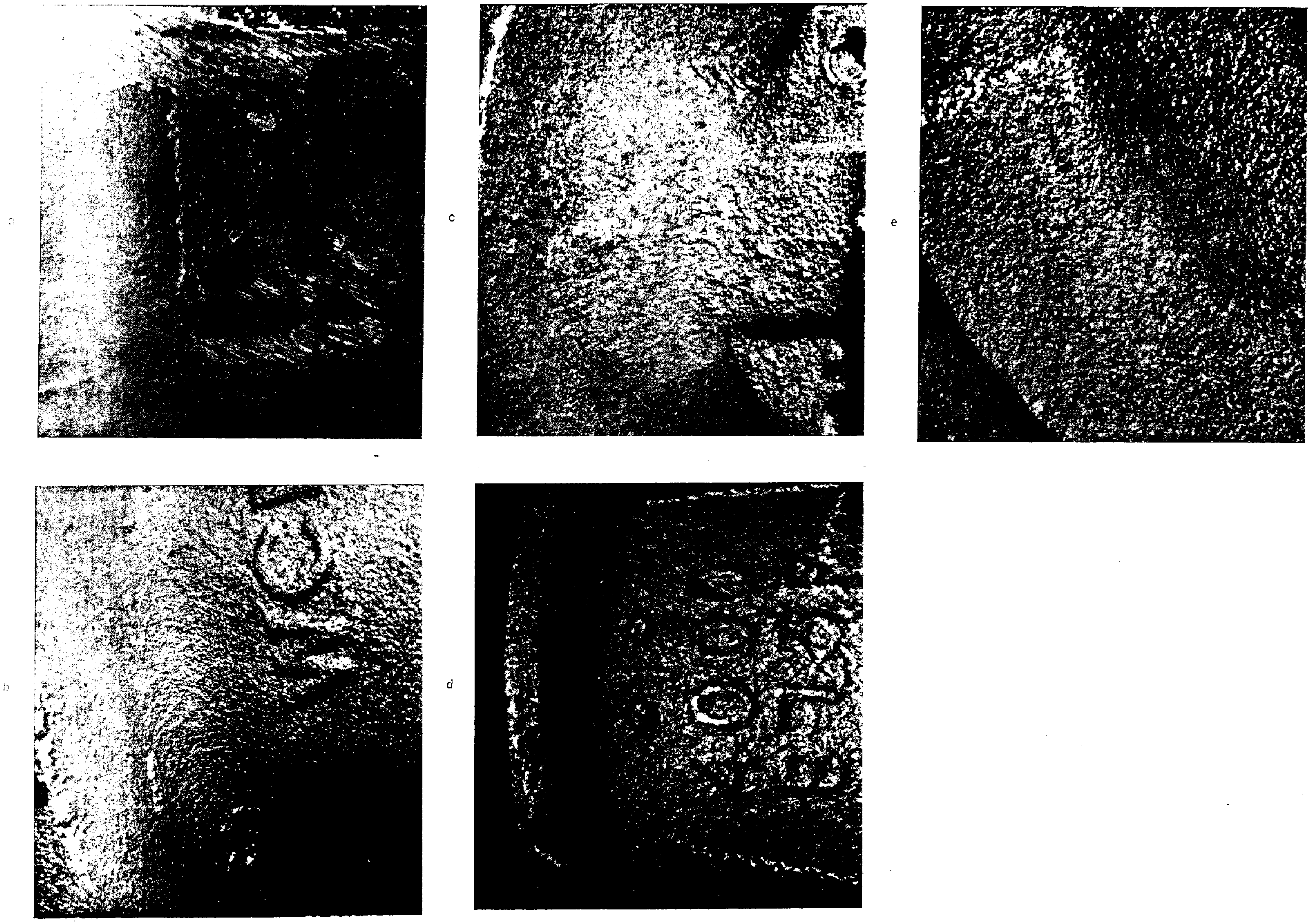

FIG. 12 TYPE XII — SURFACE ROUGHNESS